

CHAPTER 4

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### Environmental Consequences

## CHAPTER 4

### ENVIRONMENTAL CONSEQUENCES

#### I. INTRODUCTION

This chapter discloses the environmental consequences of implementing the alternatives. The description of the affected environment found in Chapter 3 provides the baseline for describing the consequences. A comparison of the alternatives is found in Chapter 2.

Chapter 4 focuses on the most significant effects. The chapter also discusses the cumulative, or combined effects of the actions of the alternatives along with past actions and reasonably foreseeable future actions.

Environmental effects will vary primarily because of the differences in the access and with the equipment proposed. Most of the effects at the dam site are similar among alternatives, because the work at the dam is governed by a consistent set of standards needed to meet dam safety requirements.

This chapter is organized into the same resource categories as Chapters 2 and 3, and follow the same order. Environmental effects that are common to all action alternatives and that are unique to each alternative are discussed. In some cases, alternatives do not differ much in their effects to a resource or response to an issue; therefore, discussions of some alternatives are lumped together. The level of detail discussed for each resource depends on the character of the particular resource and the intensity of potential effects. Additional details can be found in the appendices and in the project file at the Stevensville Ranger Station.

#### Effects Common to Alternatives 3 and 4

Alternatives 3 and 4 utilize a lighter excavator that is not capable of completing the work associated with replacing the concrete inlet structure. Alternative 2 utilizes larger construction equipment capable of completing all required work in one operating season. Alternatives 3 and 4 will require a concrete maintenance program every 3-5 years, involving the use of a helicopter to transport motorized equipment. After 20-25 years, the inlet structure will need to be replaced. This will require the use of the larger excavator described in Alternative 2.

The environmental effects of the concrete maintenance program associated with Alternatives 3 and 4 are described by resource area in this chapter. Other future environmental consequences with Alternatives 3 and 4 will result in 20-25 years from the effects of walking the excavator up the trail, driving in a cofferdam around the twin inlet pipes, pumping dry the area, excavating and removing the structure, flying out the old structure in sections with a helicopter, flying in the sections of the new structure, fitting and joining the sections, backfilling, and removing the cofferdam material, pumps, generator, jackhammer, and compactor.

The environmental consequences of these actions will be similar to but of less magnitude than those described in this chapter for Alternative 2. They will be reduced because there will only be one piece of large construction equipment, and it will be operating for an estimated 5 days instead of 25 days.

## II. PHYSICAL ENVIRONMENT

### Watershed, Soils, and Aquatic Ecosystems

#### A. Introduction

The Bass Dam reconstruction proposal has the potential to affect Bass Lake and Bass Creek water quantity and quality. Regulation of reservoir storage and releases to streamflow will not be significantly affected by the proposed alternatives. Potential water resource effects are localized. Effects are short term sedimentation at the reservoir and the stream at the reservoir outlet. Two of the alternatives propose two downstream channel crossings with construction equipment for access. The Fisheries section in Chapter 4 includes additional discussion of potential water resource effects. The effects to water resources are assessed with the assumption that best management practices for the protection of soil and water resources will be employed.

The analysis includes the effects of road/trail clearing and widening and rehabilitation, including the stream crossings. The access route is a primitive road that vehicles and equipment used 30 years ago. It has stabilized and revegetated.

There are specific assumptions about the use of best management practices along the access route and how they would mitigate effects to water resources: Alternative 3, with pack stock and helicopter access would not cause watershed effects along the trail because trail maintenance and drainage control will mitigate the increased pack stock use. Stream crossings for equipment in Alternatives 2 and 4 are rocky fords with sufficient rock in channel bed and banks to protect the channel from soil displacement and sediment introduction. Trail clearing and widening in Alternatives 2 and 4 will be minimized with the careful removal of logs, rocks, and live vegetation with the excavator bucket with grasping thumb. On the return route, after the project, the excavator will replace much of the removed material to stabilize and naturalize the trail, and will construct waterbars to improved drainage on the trail where needed.

The analysis includes the effects of dam reconstruction on soil and water at localized areas at the lake inlet and outlet. These effects are similar with all 3 action alternatives. There are specific assumptions about the use of best management practices at the dam site and how they would mitigate effects to water resources: The reconstruction work will be completed at the end of the summer irrigation season and the reservoir water level will be at it's annual minimum. Water may be pumped from the reservoir to the stream to complete some phases of work, possibly resulting in augmented late season stream flows. This is considered a benefit to aquatic ecosystems, or at least, a no effect. This will also help keep work areas near the reservoir shore drier, reducing sediment introduction. Dam reconstruction materials will be

primarily rock materials which cause little sedimentation, and any sedimentation will be very short-term and localized. The smaller materials that are needed to fill the low areas on the dam crest will be obtained from the existing borrow source area south of the dam, and no new disturbed areas will be created. The old borrow areas that are disturbed will be properly drained and revegetated upon completion of the work. Filter cloth will be placed just downstream from the outlet of the dam, to trap sediment from flowing downstream.

#### B. Consistency with Forest Plan

Forest Plan direction for water and soil resources can be summarized as maintaining soil productivity and favorable conditions of streamflow for instream and downstream beneficial water uses. Beneficial downstream uses include irrigation, fisheries, and healthy aquatic ecosystems. Best management practices (called soil and water conservation practices in the Forest Plan) are legal requirements for meeting these goals. All alternatives are consistent with Forest Plan direction for soil and water resources.

#### C. Effects by Alternative

##### 1. Effects Common to All Action Alternatives

Minor sedimentation at Bass Lake Reservoir in the immediate lower reservoir vicinity and of Bass Creek at the reservoir outlet for several hundred yards immediately downstream is likely to occur. This increase in turbidity and deposition is expected for several weeks following the activities. Best management practices, including the timing of the activities during lowest flows, will minimize this sedimentation. Additional best management practices discussed earlier in this section will ensure favorable conditions of streamflow to maintain beneficial water uses instream and downstream.

The effects of the dam repairs to soil and aquatic ecosystems at the dam and reservoir are similar among all action alternatives. The primary differences between the effects of the alternatives are the sedimentation potential resulting from means of equipment access to the dam.

Dam reconstruction and trail access will not disturb any wetlands. Best management practices discussed for protecting soil and water will also protect wetlands. Project area wetlands will not be adversely affected by any of the proposed alternatives. A cumulative and connected action is the concrete maintenance and eventual replacement of the concrete structure that is a part of Alternatives 3 and 4.

##### a) Alternative 1

There would be no effects on the water resource. Soil resources and favorable conditions of streamflow would be maintained for instream and downstream beneficial water uses. These ecosystems, and the availability of irrigation water, would be adversely affected if the dam were to fail.

##### b) Alternative 2

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This alternative would involve a total of 12 stream crossings with heavy equipment; 2 crossings each on the way in with the excavator, bulldozer, and farm tractor pulling the trailer, and 2 crossings each on the way out. This could cause minor and temporary displacement of some streambed cobbles and boulders. The majority of the access trail is away from the stream, and is so rocky that water and soil resources would not be significantly affected by heavy equipment access. Sedimentation and soil displacement would be localized, temporary, and short term. The use of the excavator to selectively place and remove rocks, logs, and vegetation follows best management practices to minimize trail soil disturbance and risk of sedimentation. The excavator will also rehabilitate the trail, providing drainage as needed. Favorable conditions of streamflow would be maintained for instream and downstream beneficial water uses. The lower 2 miles of the Bass Creek Trail, outside of the wilderness, will actually benefit from the waterbars that could be installed with the excavator, to improve drainage.

c) Alternative 3

The entire route to Bass Dam would be unaffected since heavy equipment and supplies would be helicopter transported, and there would be no heavy trail disturbance to cause increased sedimentation. The lower 2 miles of Bass Creek Trail would not receive the immediate drainage improvement work from the excavator. Trail maintenance procedures would eliminate sedimentation from increased pack stock traffic. Favorable conditions of streamflow would be provided for beneficial water uses. A slight, temporary, and local increase in water turbidity will occur when digging out around the concrete inlet structure for maintenance every 3-5 years.

d) Alternative 4

The effects of this alternative would be similar to those described in Alternative 2. This alternative would impose less effect to soil and water resources adjacent to the trail because the equipment in this alternative is narrower and lighter than the equipment in Alternative 2, causing less disturbance to the trail surface. This would create less compaction also. The smaller excavator in this alternative would also improve drainage conditions along the trail, as with Alternative 4. A slight, temporary, and local increase in water turbidity will occur when digging out around the concrete inlet structure for maintenance every 3-5 years.

### III. BIOLOGICAL ENVIRONMENT

#### 1. Fisheries

##### A. Introduction

Changes in sediment input caused by land management disturbances have important biological consequences, and can affect all components of stream ecosystems. Stream salmonids require habitats which provide food, shelter, and suitable

spawning substrate. Increased sediment input can directly or indirectly affect each of these critical habitat components.

Analysis of data collected in various Bitterroot River tributaries indicates that bull trout densities are more closely correlated to the percentage of fine sediment in the substrate than are westslope cutthroat densities (C. Clancy, MDFWP, personal communication). Leathe and Enk (1985) reported a similar pattern in the Swan River drainage where substrate score (an integrated measure of stream bed porosity and substrate composition) was the most important stream habitat variable influencing juvenile bull trout density. Westslope cutthroat and brook trout densities, conversely, were not positively correlated with substrate scores, indicating they are not as sensitive to fine sediment levels as bull trout.

The westslope cutthroat trout has been designated as the Management Indicator Species (MIS) for fisheries habitat changes in the Bitterroot Forest Plan. However, the possibility that bull trout are more sensitive to fine sediment levels than cutthroat trout has raised concerns that westslope cutthroat may not be an adequate MIS for bull trout. For this reason, sedimentation effects to bull trout are addressed separately in this analysis, and bull trout are essentially treated as a separate MIS.

The Proposed Action and Alternatives were evaluated for their potential effects to the fisheries resource by comparing predicted changes in sediment input to Bass Creek.

#### B. Consistency with the Forest Plan - Fisheries

Forest-wide management goals pertaining to fish include:

- Provide habitat to support viable populations of native and desirable non-native wildlife and fish
- Maintain habitat for the possible recovery of threatened and endangered species
- Maintain riparian flora, fauna, water quality and recreation activities
- Maintain soil productivity, water quality, and water quantity

Forest-wide management objectives pertaining to fish include:

- Maintain habitat to support current (1987) populations of catchable (> 6") trout
- Maintain or enhance fish habitat by maintaining riparian habitat and its potential to replace woody debris
- Maintain sufficient instream flows to support quality fish habitat
- Manage riparian areas to prevent adverse effects on channel stability and fish habitat

All alternatives would be consistent with Forest Plan goals, objectives, and standards for all fisheries streams within the analysis area.

#### C. Effects common to All Action Alternatives - Fisheries

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Small increases in sediment yield to Bass Creek would occur under all action alternatives as a result of repairing the dam, installing the pipe liner, widening the spillway, and/or heavy machinery use of the Bass Creek Trail. Differences in the degree of sedimentation caused by the various action alternatives would be small and difficult to quantify. Sediment input from dam reconstruction would be short-term, minor, and confined to a small section of Bass Creek immediately downstream of the dam outlet where suitable year-round fish habitat is not available and fish are only present in late summer when small numbers (< 40 fish) of westslope cutthroat trout are washed out of Bass Lake through the open dam headgates. Minor increases in sediment to this small section of stream would not significantly affect fish habitat quality or the seasonal occupancy of a few westslope cutthroat trout. Sediment produced from dam reconstruction would have no effect on downstream, perennial (year-round occupancy) populations of bull trout and westslope cutthroat trout. Minor sediment input from dam repairs would be restricted to a short time period (several weeks) during and immediately following dam reconstruction. The timing of dam repair work to coincide with seasonal low flows would minimize overall sediment input. Dam repairs would occur in early autumn when the reservoir is at low pool, and streamflows would not be significantly reduced by dam reconstruction. Renovation of the rusting transmission pipe would reduce rust deposition below the dam outlet and significantly improve stream habitat quality for all aquatic organisms in the immediate vicinity of the dam outlet. Populations of fish and other aquatic organisms would benefit in the future from the reduced threat of catastrophic loss as a result of sudden dam failure.

Changes within Bass Lake Reservoir are predicted to be negligible. Repair work would occur in autumn when the reservoir is at low pool, and reconstruction activities would not be conducted within the waters of the reservoir. Minor turbidity and sedimentation of the lower reservoir would not adversely affect westslope cutthroat trout in Bass Lake.

**D. Effects by Alternative - Fisheries**

**1. Alternative 1 - Effects to Fisheries**

Fish habitat conditions in Bass Creek, Bass Lake Reservoir, and all tributaries would remain at existing levels. Populations of fish and aquatic organisms would not be expected to change due to habitat conditions. No watershed improvement projects would occur.

Alternative 1 would have no effect on populations of bull trout, westslope cutthroat trout, and other aquatic organisms in the Bass Creek drainage. This Alternative, however, does not reduce the risk of potential dam failure and catastrophic flood. In the event of sudden dam failure, entire populations of fish and aquatic organisms could be lost. The small, isolated bull trout population in the lower half of the drainage would be particularly vulnerable to such an event.

**2. Alternative 2 - Effects to Fisheries**

Small increases in sediment yield to Bass Creek would occur as a result of



heavy equipment crossing of the stream and the re-opening of the trail for equipment access. Heavy equipment would be driven across Bass Creek in two locations. Both crossing points are rocky and stable (lower crossing = cobble & boulder-dominated substrate; upper crossing = gravel & cobble-dominated substrate), and only minor sediment input and temporary displacement of some streambed substrates would occur. Consult the project file for photographs of the two stream crossing points. Replacement of the rusting inlet-we structure

would reduce chronic rust deposition in Bass Creek immediately downstream of the dam outlet, and significantly improve stream habitat conditions for all aquatic organisms in this section of stream.

Slightly higher sediment yields produced by Alternative 2 could potentially impact individual fish or habitats in the immediate downstream vicinity of the crossing points, but would not be of a large enough magnitude to adversely affect bull trout and westslope cutthroat trout populations. Sediment input from equipment crossings would have no measureable impact on fish population viability, size, or overall reproductive success. Aquatic invertebrate production and stream habitat quality immediately below the dam outlet would be improved by replacement of the existing inlet-we structure.

### 3. Alternative 3 - Effects to Fisheries

Sediment yields to Bass Creek as a result of the initial dam reconstruction activities are predicted to be minimal and restricted to the upper sections of stream directly below the dam outlet. However, the repeated maintenance (every 3-5 years) mandated under the inlet concrete maintenance program would result in some minor sediment input to upper Bass Creek every 3-5 years. A low level of rust deposition (from the rusting inlet-we structure) on stream substrates immediately downstream of the dam outlet would continue to accumulate under this alternative.

Alternative 3 would produce the smallest and most restricted initial input of sediment of all the action alternatives. Sediment produced by this alternative would be restricted to stream reaches immediately downstream of the dam outlet; however, some minor input would occur every 3-5 years as a result of the concrete maintenance program. Sedimentation would not be of a large enough magnitude to affect bull trout and westslope cutthroat trout populations in Bass Creek. Aquatic invertebrate production immediately below the dam outlet would be lower than normal as a result of the chronic rust deposition coming out of the existing inlet-we structure.

### 4 Alternative 4 - Effects to Fisheries

Sediment yields are predicted to be intermediate when compared to those of Alternative 2 (heavy machinery crossing) and Alternative 3 (no crossing). Lighter equipment would still have to be driven across Bass Creek in two locations. However, crossing the stream with lighter vehicles would cause less disruption to the substrate, and therefore produce somewhat less sediment input than Alternative 2. Disturbance of the trail surface would also be less evident, leading to quicker trail recovery and fewer chronic erosion problems. Minor sediment input to upper Bass Creek as a result of the concrete



maintenance program would be similar to that described in Alternative 3. A low level of rust deposition (from the rusting inlet-wye structure) on stream substrates directly downstream of the dam outlet would continue to accumulate under this alternative.

Sedimentation would not be of a large enough magnitude to adversely affect bull trout and westslope cutthroat trout populations in Bass Creek. The effects of rust deposition from the existing inlet-wye structure would be similar to those detailed in Alternative 3.

#### E. Cumulative Effects - Fisheries

Bass Creek is a large stream which drains areas primarily within the Selway-Bitterroot Wilderness Area. Bass Creek and its fish populations have been altered to some extent from pre-settlement conditions by fire suppression, increased sedimentation resulting from past road and dam construction, changes in flow regime due to the creation of Bass Lake Reservoir, introductions of exotic trout species, and irrigation withdrawals below the Forest boundary.

Despite these changes, fish habitat in Bass Creek within the boundaries of the BNF is in good condition. All of the action alternatives would slightly increase short-term sediment yields, with the resulting changes being too small to measure and causing no long-term adverse effects on fish habitat quality or populations of bull trout, westslope cutthroat trout, and other aquatic organisms. Sediment input from dam reconstruction would be short-term, minor, and restricted to the immediate vicinity of the dam outlet. Alternative 2 has the potential of causing slightly higher sediment yields due to heavy equipment crossing of Bass Creek; however, these minor increases in sediment would be immeasurable. Overall, chronic dewatering for irrigation below the Forest boundary and the presence of exotic trout species (e.g. brook trout) will continue to be the greatest threats to the aquatic integrity of Bass Creek. The lack of anticipated effects to Bass Creek or Bass Lake indicates that none of the alternatives would contribute to cumulative effects in the Bitterroot River.

### 2. Threatened, Endangered and Sensitive Plant Species

#### A. Introduction

The effects of proposed management activities on sensitive plant species are assessed by estimating how activities would affect the population viability of these species throughout their geographic range. Bitterroot bladderpod (Lesquerella humilus) is the only sensitive species known to occur in or near the project area and will be evaluated for possible effects from management activities.

#### B. Consistency With the Forest Plan

The Forest Plan specifies (Forest Plan, Chapter II, page 5) that vascular plants identified as rare, pending study, or proposed as threatened or endangered would be identified and protected. The plants termed 'rare' are the plants on the Regional Forester's sensitive species list. A stated goal of

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Forest Service policy is to maintain population viability over a species' geographic range. Information on the number of plants required for maintenance of viable sensitive plant populations is not available; therefore, a conservative approach is required when determining the effects of management activities. All alternatives would achieve Forest Plan goals and standards.

C. Effects Common to all Action Alternatives

The original project proposal submitted by the permittee called for using the 1952 borrow pit site on the north side as a borrow site in the current project. However, when a population of Bitterroot bladderpod was discovered in the borrow site area, this source of material was dropped from consideration. None of the proposed alternatives includes conducting activities where Bitterroot bladderpod or other sensitive plant populations occur, including those alternatives that require future maintenance and heavy equipment work. Therefore, there will be no direct, indirect or cumulative impacts to any individual Bitterroot bladderpod plants or other sensitive plant species, their habitat, or the population viability of any sensitive plant species as a result of the proposed Bass Lake Dam Project.

3. Wildlife

This section contains narratives which display the effects of the various alternatives to the habitats and populations of the Forest Plan Management Indicator Species (MIS), Threatened, Endangered and Sensitive (TES) wildlife species and other wildlife species as listed in Chapter 3. Effects of the alternatives will be described individually for each species. Effects to all the species will also be summarized for each alternative.

Effects of management actions to wildlife species are generally a result of either habitat alteration or direct disturbance from human activities. The significance of any effects to a particular species depends in large part on the scale of the habitat alteration or disturbance. With a few exceptions, most of the wildlife species evaluated in this report are relatively mobile and have fairly large home ranges. Short-term disturbance is unlikely to affect individuals of mobile species to any extent because they can simply move away from the source of the disturbance. Minor changes in habitat are similarly unlikely to affect such individuals since their home ranges are large enough that important habitat components are replicated in various areas within them.

A. Effects to Management Indicator Species

1. Elk

As noted in Chapter 3, the amount of elk use in the Bass Creek drainage is relatively light. The drainage is not used as a migration corridor between winter and summer ranges, and the number of summer resident elk is probably severely limited by the high amount of existing human recreational activity in the area. Since elk populations are sparse, the minor habitat alterations resulting from moving heavy equipment up the Bass Creek Trail in some alternatives is not expected to have any effect on elk in this drainage. Potential temporary disturbance caused by moving equipment along the trail or

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by construction work at the dam site will likewise cause no adverse impacts to elk which will simply avoid these areas.

Elk habitat effectiveness (EHE) and elk security will remain at existing levels under all alternatives because public motorized access will not be changed in any of them.

## 2. Pine Marten

Reductions in marten habitat quality could result from removal of large trees, snags or logs which provide resting, denning and foraging sites. This could also occur as a result of reducing the coniferous crown closure over extensive areas.

Alternatives 1 and 3 would not affect marten habitat in the Bass Creek drainage because no alteration to marten habitat along the Bass Creek Trail would occur. The area around Bass Lake is poor quality habitat for marten. Human disturbance in the form of pack strings in some of these alternatives would be similar to the kinds of disturbance that animals living near the trail currently experience. This minimal project disturbance would not be expected to displace or alarm animals living near the trail.

Alternatives 2 and 4 could result in minor alterations to marten habitat if trees or snags are felled to permit passage of heavy equipment up the Bass Creek Trail. These alterations would not be expected to adversely affect individual marten living in the area, and would have no effect on the marten population as a whole on any scale. The disturbance caused by the passage of heavy equipment would be outside the experience of individuals living near the trail, and could cause some alarm. However, this disturbance would be temporary and would not be expected to displace any marten.

## 3. Pileated Woodpecker

Reductions in pileated woodpecker habitat quality along the Bass Creek Trail could result from the removal of large existing snags and trees which could be used for nesting habitat. Removal of large down logs and rotten snags and stumps could also reduce foraging opportunities for these birds. Large snags are often considered safety hazards during mechanized forest operations and hazardous snags are felled to prevent injury to workers. The high elevation of Bass Lake Dam and the proposed construction zone is poor habitat for pileated woodpeckers.

Alternatives 1 and 3 would not be expected to affect pileated woodpecker habitat quality because there would be no need to remove large snags, trees or down logs. Human disturbance in the form of pack strings in Alternative 3 would be similar to the kinds of disturbance that pileateds living near the trail currently experience. This minimal project disturbance would not be expected to displace or alarm animals living near the trail.

Alternatives 2 and 4 could result in some alterations to pileated habitat if large trees or snags are felled to permit passage of heavy equipment up the Bass Creek Trail. These alterations would be unlikely to adversely affect

individual pileateds living in the area, but it is possible that felling a large snag could eliminate important nesting habitat for a particular bird if other suitable snags are not available within its territory. It is unlikely that even this scenario would have any effect on the pileated population as a whole on any scale. The disturbance caused by the passage of heavy equipment would be outside the experience of individuals living near the trail, and could cause some alarm. However, this disturbance would be temporary and would not be expected to displace pileateds on a permanent basis.

#### B. Effects to Threatened, Endangered and Sensitive Species

Expected effects of the alternatives are summarized only for those threatened, endangered and sensitive species which are known or expected to occur in the analysis area, as described in Chapter 3. No effects are expected to the common loon, northern bog lemming or bald eagle because suitable habitat for these species does not occur in the analysis area. These species will not be discussed further in this analysis. A Biological Evaluation which analyzes expected effects of the selected alternative to TES species is included in the project file.

##### 1. Sensitive Species

###### a) Boreal owl

Potential boreal owl habitat in the Bass Creek drainage is located in areas of mature to overmature timber on aspects ranging from northwest to east which are over 5000 feet in elevation. The upper several miles of the riparian area along Bass Creek is also potentially suitable boreal owl habitat.

Reductions in boreal owl habitat quality along the Bass Creek Trail could result from the felling of large existing snags and trees which could be used for nesting habitat. Removal of large down logs which provide habitat for small mammals could also reduce foraging opportunities for these birds. Large snags are often considered safety hazards during mechanized forest operations and hazardous snags are felled to prevent injury to workers.

Alternatives 1 and 3 would not be expected to affect boreal owl habitat quality because there would be no need to remove large snags, trees or down logs along the Bass Creek Trail. Human disturbance in the form of pack strings in some of these alternatives would be similar to the kinds of disturbance that boreal owls living near the trail currently experience. This minimal project disturbance would not be expected to displace or alarm animals living near the trail.

Alternatives 2 and 4 could result in some minor alterations to boreal owl habitat if large trees or snags are felled to permit passage of heavy equipment up the Bass Creek Trail. These alterations would be unlikely to adversely affect individual boreal owls living in the area, but it is possible that felling a large snag could eliminate important nesting habitat for a particular bird if other suitable snags are not available within its territory. It is unlikely that even this scenario would have any effect on the boreal owl population as a whole on any scale. The disturbance caused by the passage of

heavy equipment would be outside the experience of individuals living near the trail, and could cause some alarm. However, this disturbance would be temporary and would not be expected to displace boreal owls on a permanent basis.

b) Flammulated owl

Potential flammulated owl habitat occurs within relatively open stands containing mature to overmature ponderosa pine and Douglas-fir. In the Bass Creek drainage, suitable habitat occurs mostly on timbered portions of the south-facing canyon walls or in the riparian area adjacent to the lower several miles of Bass Creek in the canyon.

Reductions in flammulated owl habitat quality along the Bass Creek Trail could result from the felling of large existing snags and trees which could be used for nesting habitat. Large snags are often considered safety hazards during mechanized forest operations and hazardous snags are felled to prevent injury to workers.

Alternatives 1 and 3 would not be expected to affect flammulated owl habitat quality because there would be no need to remove large snags or trees along the Bass Creek Trail. Human disturbance in the form of pack strings in some of these alternatives would be similar to the kinds of disturbance that any flammulated owls living near the trail currently experience. This minimal project disturbance would not be expected to displace or alarm owls living near the trail.

Alternatives 2 and 4 could result in some minor alterations to flammulated owl habitat if large trees or snags are felled to permit passage of heavy equipment up the Bass Creek Trail. These alterations would be unlikely to adversely affect individual flammulated owls living in the area, but it is possible that felling a large snag could eliminate important nesting habitat for a particular bird if other suitable snags are not available within its territory. It is unlikely that even this scenario would have any effect on the flammulated owl population as a whole on any scale. The disturbance caused by the passage of heavy equipment would be outside the experience of individuals living near the trail, and could cause some alarm. However, this disturbance would be temporary and would not be expected to displace boreal owls on a permanent basis.

c) Black-backed woodpecker

None of the alternatives are likely to have any effects to black-backed woodpeckers because there is no concentration of recently killed trees within the Bass Creek drainage which would attract this species. Even if isolated patches of trees killed by insects or pathogens which occurred near the trail were used as a nest site by this species, project activities would occur after juvenile woodpeckers have fledged and dispersed.

d) Low-density, Wide Ranging Carnivores

This informal grouping generally includes fisher, lynx and wolverine. Gray wolves and grizzly bear could also be included, but are addressed separately in this document.

The greatest potential adverse effect to this group of species is often increased human predation (trapping or shooting) which results from increased road access to remote areas of suitable habitat. Open road density in the analysis area will not change from the existing condition under any alternative, so the potential for human predation will not change.

e) Fisher

The entire riparian area along Bass Creek is suitable habitat for fisher, and it is likely that fisher inhabit the drainage. Fisher use cavities in snags and down logs for denning (Ruggiero, et al. 1994), so these habitat features are important to the species. Fisher have relatively large home ranges, so are likely to have a greater selection of snags and logs to use for denning. This reduces the importance of any particular snag or log.

Reductions in fisher habitat quality along the Bass Creek Trail could result from the felling of large existing snags and trees which could be used for denning habitat. Large snags are often considered safety hazards during mechanized forest operations and hazardous snags are felled to prevent injury to workers.

Alternatives 1 and 3 would not be expected to affect fisher habitat quality because there would be no need to remove large snags or trees along the Bass Creek Trail. Human disturbance in the form of pack strings in some of these alternatives would be similar to the kinds of disturbance that any fisher living near the trail currently experience. This minimal project disturbance would not be expected to displace or alarm fisher living near the trail.

Alternatives 2 and 4 could result in some minor alterations to fisher habitat if large trees or snags are felled to permit passage of heavy equipment up the Bass Creek Trail. These alterations would be unlikely to adversely affect individual fisher living in the area because fisher home ranges are large enough that other suitable denning sites should be available. Alterations to crown closure would be too minor to affect fisher.

It is unlikely that felling scattered snags and large trees would have any effect on the fisher population as a whole on any scale. The disturbance caused by the passage of heavy equipment would be outside the experience of individuals living near the trail, and could cause some alarm. However, this disturbance would be temporary and would not be expected to displace fisher on a permanent basis.

f) Lynx

Lynx utilize large upper-elevation home ranges which contain both mature and overmature forests and sapling stands. Denning and foraging sites are related to the presence of abundant down woody debris rather than snags and large trees. It is unlikely that minor habitat alterations associated with any of the action alternatives would have any effect on lynx habitat quality.



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Human disturbance associated with implementation of Alternatives 1 and 3 would be similar to the kinds of disturbance that any lynx living in the drainage currently experience. This minimal project disturbance would not be expected to displace or alarm lynx.

Human disturbance caused by the passage of heavy equipment associated with implementation of Alternatives 2 and 4 would be outside the experience of lynx residing in the drainage, and could cause some alarm. However, this disturbance would be temporary and would not be expected to displace lynx on a permanent basis.

g) Wolverine

Given the very large territory size of individual animals, there is little practical difference between any of the action alternatives in terms of effects to wolverine. Minor habitat alterations along the Bass Creek Trail in some alternatives would be inconsequential to wolverine. Existing levels of recreational use of the Bass Creek Trail probably cause wolverine to avoid areas near the trail, so additional activities associated with implementation of any of the action alternatives would not be expected to cause any additional effects.

All action alternatives have the potential of disturbing a wolverine in the Bass Lake basin. However, existing levels of human disturbance in this area related to recreational activities probably cause wolverine to avoid this area except during the winter/spring season. Activity related to dam reconstruction would not be expected to have additional effects beyond these existing recreational effects.

h) Townsend's big-eared bat

None of the alternatives will have any effects to Townsend's big-eared bats. Even in the unlikely event that this species uses the Cliff Mine as a roost site, all project activities will occur far enough from this site no disturbance would be expected.

i) Coeur d'Alene Salamander

None of the action alternatives will alter the existing condition of streamside vegetation or water flow, so there should be no effect to Coeur d'Alene salamanders which may inhabit suitable seep or spray zones along Bass Creek.

In a worst-case scenario, selection of the No Action alternative could eventually result in catastrophic failure of the dam. The resulting debris torrent could potentially eliminate any populations of Coeur d'Alene salamanders which may be present along Bass Creek through habitat loss.

j) Harlequin duck

None of the alternatives will have any effects to harlequin ducks. There would be no change to suitable habitat on Bass Creek as a result of implementing any of the alternatives. Any harlequin ducks which may use Bass Creek as a

breeding territory would leave the area to migrate back to the Pacific coast by mid-August. Under the proposed project schedule, project activities would not commence until after harlequins have left, so there would be no disturbance to this species.

## 2. Threatened and Endangered Species

### a) Peregrine falcon

Falcons could potentially occupy the Bass Creek drainage in the near future, but nesting activities would be confined to the steep rocky cliffs in the canyon. Most of the potential nest sites are located on the open south aspects north of Bass Creek.

The only activities associated with any of the alternatives which could potentially affect peregrines would be helicopter flights. However, peregrine chicks fledge from early to mid-July from known nests in the Bitterroot Mountains, so there would be no risk of disturbing nesting birds given the schedule for project implementation.

### b) Gray wolf

None of the action alternatives is expected to adversely affect gray wolves which might move through the area. Roaded access would not be increased, and populations of deer and elk in the area would not change as a result of any of the alternatives. None of the action alternatives would adversely affect corridors linking existing and potential subpopulations of wolves. Construction activities might cause wolves moving through the area to avoid the Bass Lake basin temporarily, but existing recreational use of the area would likely cause a similar reaction.

### c) Grizzly bear

Grizzly bears are not currently known to occupy the Bitterroot Mountains, so none of the alternatives would cause any direct effect to this species. None of the alternatives would result in any changes to habitat which would affect potential future populations of grizzlies which may become established in this area. Therefore, none of the alternatives will have any effect on grizzly bears or their habitat.

## 3. Other Wildlife Species

### a) Mountain Goat

None of the alternatives will have more than a very minor effect on mountain goat habitat. The only potential for habitat impacts might be in the talus borrow area near the dam.

Goats are more likely to be affected by disturbance than by habitat alteration from this project. Goats will not be disturbed by mechanized or non-mechanized use of the Bass Creek Trail because they generally stay higher on the slopes. They are also not likely to be disturbed by construction activities around the

dam and would be expected to simply avoid the immediate area (Nielsen, 1995 pers. comm.).

There is some potential for adverse impacts to goats from the helicopter flights which would occur under most alternatives. Goats seem to be much more susceptible to disturbance from aircraft than from people or equipment on the ground (Nielsen, 1995 pers. comm.). For this reason, alternatives which include the most helicopter use would impact mountain goats the most. Alternative 3 would have the most potential for adverse effects to goats, while Alternatives 2 and 4 would have somewhat less potential for such impacts. Alternative 1 would have little potential for adverse impacts to goats. Alternatives 3 and 4 also would disturb goats for a brief period during late summer, every 3-5 years, to complete the concrete and inlet maintenance with a helicopter.

The impacts of helicopter flights to mountain goats will be minimized by designating a flight corridor on the south side of the drainage. Mountain goat use is concentrated on the open, south-facing slopes north of Bass Creek. A flight path over the north aspects will keep helicopters farther from goats in the drainage which would reduce the amount of disturbance to these animals.

### C. Effects of the Alternatives Summary

#### 1. Alternative 1

This alternative would not alter the habitat or change the existing level of human disturbance to any wildlife species in the area, in the short term. However, if the dam would fail because of lack of action, floodwaters would affect downstream wildlife habitat and populations.

#### 2. Alternative 2

This alternative would result in minor habitat alterations along the Bass Creek Trail due to widening the trail to allow passage of heavy equipment. Operating heavy equipment on the trail could also potentially disturb animals living near the trail which are not accustomed to motorized equipment. This alternative has the potential for minor impacts to pine marten, boreal and flammulated owls and fisher along the trail. It also has some potential for impacts to mountain goats due to disturbance from helicopter flights up and down the drainage.

#### 3. Alternative 3

This alternative would have no effect on wildlife species along the Bass Creek Trail because there would be no habitat alteration along the trail to allow for the passage of construction equipment. In addition, there would be no disturbance from motorized equipment on the trail. The potential for disturbance to mountain goats would be somewhat higher than in Alternative 2 because a heavy helicopter would be required to transport pieces of the excavator and dump truck to the construction site. This alternative also would disturb goats for a brief period during late summer, every 3-5 years, to complete the concrete and inlet maintenance with a helicopter. Disturbance

along the trail, similar to Alternative 2, would take place in 20-25 years, when the inlet structure is replaced.

#### 4. Alternative 4

Effects of this alternative to wildlife species along the trail and near the lake would be similar to those described for Alternative 2, although there would be less clearing and widening of the trail, and somewhat less disturbance to vegetation along the trail. This alternative also would disturb goats for a brief period during late summer, every 3-5 years, to complete the concrete and inlet maintenance with a helicopter. Disturbance along the trail, similar to Alternative 2, would take place in 20-25 years, when the inlet structure is replaced.

### IV. HUMAN ENVIRONMENT

#### 1. Cultural Resources

Section 106 of the National Historic Preservation Act requires that federal agencies must consider the effects of the agency's undertakings on properties included in or eligible for the National Register of Historic Places. According to 36 CFR Part 800: Protection of Historic Properties, "An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register (of Historic Places.) For the purpose of determining effect, alteration to features of the property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered." (36 CFR 800.9 (a).) Analysis for the proposed Bass Lake Dam Reconstruction was designed to comply with this direction. The requirements of the National Historic Preservation Act will have been met when we receive a response from SHPO that agrees with our findings.

##### A. Direct Effects

No sites were discovered during the 1993 inventory for the proposed alternatives or during previous archaeological surveys which included areas analyzed for effects to cultural resources for the current project. No activities are planned within one mile of the two documented sites located outside the project impact area of the Bass Lake Dam Reconstruction site. Based on knowledge of the patterns of prehistoric and historic land use in the area, the area's topography and environment, and the results of cultural resource inventories in the area, there is low likelihood for impact on significant cultural resources in the area of potential effect.

##### B. Indirect Effects

Indirect impacts such as noise produced by tree removal along the trail, or equipment used for the dam reconstruction or the visual effect of the rock quarry on cultural resources were also considered within the analysis area.

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Since no sites were discovered within the area analyzed for effects to cultural resources, there is low likelihood that indirect effects on cultural resources will occur.

C. Cumulative Effects

Because no cultural resources were recorded within the area analyzed for potential effects, there should be no cumulative effects within this area. The rock quarry and staging area associated with the dam reconstruction is actually reflective of the importance of ongoing water use since the first Bass Lake Dam was constructed in 1887.

No significant cultural resources are likely to be irretrievably or irreversibly affected by any of the alternatives. After an alternative is chosen, project plans will be reviewed and further cultural resource inventory will be conducted if necessary. Additional inventory may include archival study, on-the-ground survey, and/or shovel testing. Evaluation of sites and assessment of project effects on significant sites will be conducted in consultation with the State Historic Preservation Officer (SHPO) as required by Section 106 of the National Historic Preservation Act. Physical avoidance of sites is standard procedure on the Bitterroot National Forest except where imprudent or impractical. In cases where avoidance is not feasible, mitigation measures are designed in consultation with the SHPO and the Advisory Council for Historic Preservation to minimize adverse effects. If previously unknown cultural resources are encountered during implementation of the project, activities will be halted and the Forest Archaeologist will be notified immediately.

2. Social and Economics

A. Total Costs by Alternative

ALTERNATIVE 1 - NO ACTION

This alternative would have no immediate costs; however, increased maintenance costs will be a result of correcting dam deficiencies. Also, if the dam were to catastrophically fail as a result of not making the needed repairs, there could be major costs and liabilities due to loss of property, resources, and human lives.

ALTERNATIVE 2 - PROPOSED ACTION

|                   |          |
|-------------------|----------|
| Mobilization      | \$10,000 |
| Helicopter        | 12,500   |
| Camp              | 200      |
| Pipe              | 31,000   |
| Trash rack        | 1,800    |
| Spillway widening | 2,500    |
| Rip-rap/filling   | 16,100   |
| Log boom          | 2,300    |

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|                 |              |
|-----------------|--------------|
| Inlet           | 18,400       |
| Misc. site work | 2,700        |
| Cleanup         | 3,000        |
| Demobilization  | 14,000       |
| Superintendent  | 5,000        |
| Contingency     | 12,000       |
| Trail rehab     | <u>8,000</u> |
| TOTAL           | \$139,500    |

ALTERNATIVE 3 - FLY IN LIGHTER EQUIPMENT

|                   |               |                                                 |
|-------------------|---------------|-------------------------------------------------|
| Mobilization      | \$39,600      |                                                 |
| Helicopter        | 17,520        |                                                 |
| Camp              | 200           |                                                 |
| Pipe              | 31,000        |                                                 |
| Trash rack        | 1,800         |                                                 |
| Spillway widening | 2,500         |                                                 |
| Rip-rap/filling   | 17,750        |                                                 |
| Log boom          | 2,300         |                                                 |
| Misc. site work   | 2,700         |                                                 |
| Cleanup           | 2,750         |                                                 |
| Demobilization    | 29,700        |                                                 |
| Superintendent    | 7,360         |                                                 |
| Contingency       | <u>15,500</u> |                                                 |
| TOTAL             | \$170,680     |                                                 |
| Inlet maintenance | 10,000        | Estimated at \$2,000 every 4 years for 20 years |
| Inlet replacement | 20,000        | Needed in 25 years                              |
| Trail rehab       | <u>5,000</u>  | Needed in 25 years                              |
| TOTAL             | \$205,680     | Includes estimated future costs                 |

The additional helicopter costs for Alternative 3 are included in the mobilization and demobilization categories.

ALTERNATIVE 4 - WALK IN LIGHTER EQUIPMENT

|                   |              |
|-------------------|--------------|
| Mobilization      | \$29,800     |
| Helicopter        | 17,520       |
| Camp              | 200          |
| Pipe              | 31,000       |
| Trash rack        | 1,800        |
| Spillway widening | 2,500        |
| Rip-rap/filling   | 17,750       |
| Log boom          | 2,300        |
| Misc. site work   | 2,700        |
| Cleanup           | 2,750        |
| Demobilization    | 18,400       |
| Superintendent    | 7,360        |
| Contingency       | 13,450       |
| Trail rehab       | <u>5,600</u> |



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|                   |              |                                                 |
|-------------------|--------------|-------------------------------------------------|
| TOTAL             | \$153,130    |                                                 |
| Inlet maintenance | 10,000       | Estimated at \$2,000 every 4 years for 20 years |
| Inlet replacement | 20,000       | Needed in 25 years                              |
| Trail rehab       | <u>5,000</u> | Needed in 25 years                              |
| TOTAL             | \$188,130    | Includes estimated future costs                 |

Alternative 2 is the least cost alternative. The use of the heavier equipment in this alternative would also allow the inlet pipe and concrete casing around the inlet pipe to be rebuilt, along with the other repair work, in one season. Without the heavier equipment in Alternative 2, a concrete maintenance program will be required for the inlet pipe, every 3-5 years, in Alternatives 3 and 4. This maintenance will extend the life of the inlet pipe and the concrete for another 20-25 years. The maintenance will require the use of motorized equipment and a helicopter. Alternatives 3 and 4 also include the estimated future costs of replacing the concrete inlet structure, and the estimated future costs of road rehabilitation, in 1995 dollars.

The costs of Alternative 3 are the highest of the 3 action alternatives, primarily because of the higher transportation costs associated with helicopter transport.

Costs in Alternatives 2 and 4 include the work needed to rehabilitate and naturalize the old road as the equipment leaves the project site. All alternatives include a 10% contingency cost estimate, for unplanned events.

All action alternatives would provide for a continuous flow of water from the reservoir for beneficial downstream uses. Those uses and values are described in Chapter 3.

### 3. Wilderness, Trails, Recreation

#### A. Introduction

This section will discuss and disclose the environmental effects of this project on the wilderness, trails and recreation resources of the Bass Creek drainage from its headwaters at the Idaho border to the wilderness boundary, approximately 6 miles to the east. Also included are effects outside of wilderness. This includes approximately 2.5 miles of the Bass Creek Trail # 4 from the wilderness boundary to the trail's origin at the trailhead near the Charles Waters Memorial Campground.

Parameters against which the effects are measured were determined through public scoping. Criteria are also included in the Forest Plan and the amendment titled The Selway-Bitterroot Wilderness General Forest Plan Management Direction, which was approved in 1992. That document discloses standards and management direction for wilderness, trails and recreation. The environmental consequences of the various alternatives will be discussed and evaluated within the context of three settings: the resource setting (natural integrity, apparent naturalness, remoteness and special features); the social setting which is related to solitude; and the management and administrative setting.

In addition, other applicable laws, regulations and policies are taken into consideration as they regulate or affect activities related to wilderness, recreation and trails.

#### B. Consistency With Forest Plan Standards

The Bitterroot National Forest Plan established goals for the Selway-Bitterroot Wilderness (Forest Plan, 1987, and Amendment #7, 1992):

- Preserve the integrity of the Selway-Bitterroot Wilderness resource to meet the purposes described in the Wilderness Act; to protect and preserve natural conditions so that the wilderness generally appears to have been affected primarily by the forces of nature, with the imprint of human work substantially unnoticeable, and has outstanding opportunities for solitude or primitive and unconfined recreation.
- Provide for limiting and distributing visitor use of specific portions in accord with periodic estimates of the maximum levels of use that allow natural processes to operate freely and that do not impair the values for which wildernesses were created.
- Application of a Prevention of Significant Deterioration (PSD) approach to prevent a net degradation of the wilderness resource, while acknowledging that wilderness and the impacts caused therein, are dynamic.

The Bitterroot National Forest Plan specifies in Amendment # 7 Section II, M-2:

- Environmental assessments or environmental statements will be prepared for all reconstruction and heavy maintenance work on reservoirs within the wilderness. These reports will include analysis of non-motorized vs. motorized means of doing the work. Motorized equipment or other non-conforming activities will be authorized when it can be demonstrated that: 1) it is the only feasible means of accomplishing the necessary maintenance; and, 2) the continued existence of the reservoir is more in the public interest than its breaching. Feasibility for the use of primitive equipment will be based on the technical requirements of the project.

Wilderness-wide indicators and standards are also directed by the Forest Plan Amendment, including: (Section II, A-1)

- The minimum tool principle is to be applied to the management of all resources within the Selway-Bitterroot Wilderness. This means that the minimum management actions necessary to correct a given problem will be identified. These will be implemented using the methods and equipment which accomplish the objective with the least impact on the physical, biological and social characteristics of wilderness."

All Alternatives are designed to meet the minimum tool principle

#### C. Features Common to All Alternatives

It is unlikely that there would be any cumulative effects or connected actions associated with any of the alternatives to this proposal. There are no additional planned activities in the drainage area, except for trail maintenance, and future dam maintenance activities. The reconstruction work is expected to reduce the amount of future maintenance needs, especially with Alternative 2. There are no additive aspects of existing activities nor are there other connected or anticipated activities in this part of the Selway-Bitterroot Wilderness.

Wilderness attributes will be affected to some extent by all of the action alternatives. The presence of the Bass Lake Dam and the old road affects the wilderness attributes listed below. This analysis will not address the existing effects of the dam, only the effects of the proposed access and repair work.

All action alternatives include provisions for public safety at the dam site and along the access route.

#### D. Effects to Wilderness Attributes Common to All Alternatives

Natural Integrity refers to the extent to which long-term ecological processes are intact and operating, and is measured by the presence and magnitude of human induced change to an area. Long-term processes will not likely be affected by any of the alternatives because the various activities associated with the completion of this project are short-term and localized. They are also occurring in previously disturbed areas.

Apparent Naturalness is indicated by how the environment looks to most people using the area. The apparent naturalness of the trail corridor will be affected by all action alternatives except Alternative 3. All alternatives except Alternative 3 would involve the transportation of equipment along the old road, most of which is used as a foot and horse trail. This would result in soil and vegetation disturbance and displacement. In the short-term, broken, cut and damaged vegetation along the travel route will cause an unnatural appearance. Movement of equipment will result in varying degrees of soil disturbance which may be apparent for an extended time following that activity. Repair activities at the dam site will have short term effects on sight and sound. This reduction in apparent naturalness will be confined to each side of the old road and immediately adjacent to the reservoir.

Remoteness is a perceived condition of being secluded, inaccessible and out of the way. This feature will be impacted by each alternative during the period of work. Sights and sounds of the reconstruction work will be apparent near the dam and reservoir, affecting the feeling of remoteness.

Solitude is a personal, subjective value defined as an isolation from the sights, sound and presence of others and the developments of man. The presence of men and equipment, and the disturbance due to that presence will affect the solitude of the area during the implementation of the alternatives and for a short time after by the physical disturbance of vegetation and soil.

Special Features are those unique geological, biological, ecological, cultural, or scenic features that may be located in wilderness. No unique features will be affected by any of the alternatives.

E. Alternatives Considered in Detail

1. No Action

a) Wilderness Values

This alternative would have no effect on wilderness in the short term. However, in the long-term, if the dam is not repaired there is the possibility of breach and subsequent destruction of vegetation, catastrophic soil movement and drainage scouring which would be an irreversible indicator of man's presence.

b) Recreation/Trails

Similar to the effects to wilderness, the possible overtopping of the dam and the destruction accompanying that breach could affect recreation access in the drainage for an extended period of time. The access provided by the trail would not be available for recreationists.

2. Proposed Action

a) Wilderness Values

Direct/Indirect Effects - This alternative would affect 3 of the 6 attributes of the wilderness resource. Apparent naturalness would be directly affected by aircraft activities, ground transport of supplies and personnel, repair activities at the dam site and ground transport of the heavy equipment up and down the drainage over a period of approximately 8-10 days. Total duration of the project including access and egress would be approximately 25 days. Clearing and damage of some vegetation, excavating the rock slide for 200 feet along the old road, repair activities, and the associated noise would all impact the apparent naturalness of the wilderness during the project period.

The largest negative effect with the greatest duration would be the excavation and ground disturbance that would occur within the 200 foot section, for the removal of the rock slide. Much of this section of the old road has been obliterated by a rock slide which would take excavation work to remove. That removal would displace large amounts of rock from their natural resting place and it would be difficult to restore apparent naturalness. Remoteness and solitude features would also be affected similar to apparent naturalness under this alternative. These attributes would be affected primarily during the actual work periods. The direct impacts to wilderness attributes with this alternative would be of the shortest duration compared to the other 2 action alternatives. This alternative also eliminates the need for the future disturbances to wilderness values from the concrete maintenance, and the eventual replacement of the concrete inlet structure.

As the heavy equipment leaves the project, the excavator would mitigate the trail impacts by replacing disturbed rocks and soil, and by removing severely damaged vegetation.

This alternative will meet the wilderness standard which directs the use of the minimum tool principle, as described in part B of this section. Although it is possible to complete the required work and achieve the purpose and need for action with lighter and smaller equipment that would have less impact on wilderness values and on the trail, this alternative was designed to complete all the work in one entry, and in the shortest duration.

#### b) Recreation/Trails

Direct/Indirect Effects - Trails and recreation will be discussed together because all recreation activities are associated with trail use in the assessment area. Trail # 4 will be used to access the reservoir under this alternative. Movement of heavy equipment and supplies over the old road would displace soil, and involve clearing a portion of the existing trail. That portion of the trail which is not on the old roadbed will not be disturbed.

Sections of the trail are currently not meeting Forest Service standards for a mainline trail and are also not meeting the opportunity class standards set by the Forest Plan. At the end of the project, the equipment would be used to rehabilitate those portions of the trail and roadbed affected by movement of equipment. The equipment would also be used to improve drainage and tread composition on the trail. The larger equipment in this alternative would be able to move larger boulders and logs for trail naturalizing and narrowing. These measures would improve the trail to mainline standards and to Forest Plan standards. A trail rehabilitation plan will be implemented as the equipment leaves the project on the trail.

Recreational use of the trail would be limited during the movement of the equipment along the trail. Trail use restrictions would be minimized through the use of the wilderness ranger to monitor progress and to inform users. Public notifications would occur through notices at the trailhead, and by public service announcements prior to that activity. During the more extensive work to clear or rehabilitate the access road, hikers might have to do a limited amount of cross-country travel to circumvent the activity. Stock users would be precluded from use of the trail during this time period.

### 3. Fly in Lighter Equipment/No Motorized Ground Transport

#### a) Wilderness Values

Direct/Indirect Effects - This alternative would affect 3 of the 6 features of the wilderness resource. Apparent naturalness would be directly affected by aircraft activities and those ground activities associated with the actual repair of the dam. Effects of aircraft noise and visibility would occur during the transport phase of the project and infrequently during the repair phase. During the transport phase (about 4 days duration) there would be almost continuous visual and audio disturbance the entire length of the drainage.

During the repair phase of the project, transport of supplies with individual weights in excess of 100 pounds would be airlifted to the repair site. These flights would be infrequent and coordinated to assure they are of the minimum duration.

Transport of personnel and lightweight equipment and supplies would be done by pack string. It is estimated that this activity would require a pack string of approximately 16 animals and would entail about 20 round trips during the estimated 50 day period of the project. The duration of this alternative imposes an extended disturbance to wilderness resources at the dam site and along the trail. A larger camp and stock handling facility would be needed at the dam site. Work activities at the dam site would be accomplished with hand tools where practical, along with the minimum tool principal.

With this alternative, a maintenance program to patch and seal the concrete inlet structure would occur every 3 to 5 years, until the structure would be replaced, in an estimated 20-25 years. This maintenance would require entries with a helicopter and motorized equipment, and would require a work camp over a period of 3-5 days. This would effect social wilderness attributes during the maintenance period. This alternative would have less effect to the apparent naturalness and wilderness attributes along the Bass Creek Trail, because the trail will not be used by motorized construction equipment.

#### b) Recreation/Trails

Direct/Indirect Effects - Trail # 4 will be used to transport the personnel, equipment and supplies that weigh less than 100 pounds. This will require use of a pack string. The estimated 20 trips will be in excess of normal use on this trail and under moist conditions can cause trail tread disturbance and increased wear and tear on trail structures such as waterbars and culverts.

This use will be mitigated by requiring the company to rehabilitate the trail consistent with regional standards at the end of the project. The assessment area is within Opportunity Class 4 which provides for a moderate to low opportunity for isolation and solitude. The probability of encountering other users in the area is moderate to high. With these settings in mind, the effect of the encounters with the pack string, and the effects of the additional ground disturbance is unlikely to be highly significant to users, and will be limited to a relatively short duration, although rehabilitation work on the trail could extend this. Public notices will be employed to inform users of possible effects due to this project, through radio announcements, newspaper articles, and signing at the trailhead. Recreational use of the trail will not be impacted significantly during the project except at the dam site, which will be closed during the construction activities.

This alternative does not involve walking equipment up the Bass Creek Trail and would not improve the drainage conditions or the existing tread width on the Bass Creek Trail.

#### 4 Walk in Lighter Construction Equipment

##### a) Wilderness Values



Direct/Indirect Effects - This alternative is similar to Alternative 2, except for the use of lighter construction equipment that would require less clearing and trail work. Like Alternative 2, this alternative would effect 3 of the 6 features of the wilderness resource. Apparent naturalness would be directly affected by aircraft activities, ground transport of supplies and personnel, repair activities at the dam site and ground transport of the heavy equipment up and down the drainage over a period of approximately 8-10 days. Total duration of the project including ingress and egress would be approximately 35 days. This would present an intermediate level of disturbance to wilderness social values, between Alternatives 2 and 3. Clearing and damage of some vegetation, helicopter flights, repair activities and the associated noise would all affect wilderness attributes, especially the apparent naturalness along the trail.

Like Alternative 2, the section of trail that would be most affected for the longest period would be along the 200 feet of old road just below the reservoir where the old road has been obliterated by a rock slide. This alternative would not require as much excavation work to widen this section because of the use of the smaller and lighter equipment. Individual rocks would be removed and placed into position to allow passage of the equipment. That removal would displace minor amounts of rock from their natural resting place. Remoteness and solitude features would also be affected similar to apparent naturalness under this alternative. These attributes would be affected primarily during the actual work periods.

As the heavy equipment leaves the project, the excavator would implement the trail rehabilitation plan and would mitigate the trail impacts by replacing disturbed rocks and soil, and by removing severely damaged vegetation.

Like alternative 3, a maintenance program to patch and seal the concrete inlet structure would occur every 3 to 5 years, until the structure would be replaced, in an estimated 20-25 years. This maintenance would require entries with a helicopter and motorized equipment, and would require a work camp over a period of 3-5 days. This would effect social wilderness attributes during the maintenance period.

#### b) Recreation/Trails

Direct/Indirect Effects - Like Alternative 2, Trail # 4 will be used to access the reservoir under this alternative. Movement of the construction equipment over the old road would displace soil, and involve widening and clearing of a portion of the existing trail. That portion of the trail which is not on the old roadbed will not be disturbed. Sections of this trail are not meeting Forest Service standards for a mainline trail and the Opportunity Class standards set by the Forest Plan. As the equipment departs the project it will be used to rehabilitate those portions of the trail and roadbed affected by movement of equipment. This would improve the trail to mainline standard, restoring it to a safe, stable condition.

Recreational use of the trail would be restricted like the other alternatives to ensure public safety.

#### 4 Developed Recreation

##### A. Alternative 1 - No Action

This alternative would not have any effect on the current developed recreation activities or facilities. If the dam should fail as a result of no action, the Charles Waters Campground, Bass Creek Trailhead, and the Fitness and Nature Trail would be affected.

##### B. Alternative 2 - Proposed Action

This Alternative would have some direct effects upon the developed campground user and hiker, hunter, biker, or horseback rider that recreates in the general vicinity of the canyon mouth. Effects in the form of audio and visual intrusions by helicopters will be noticed by any campers and early season hunters, and other recreationists in the campground and trailhead area. The impacts would occur for short periods as the helicopter passes between the helibase on private property to the mouth of the canyon, and up to Bass Lake. Helicopter use is planned to occur after the Labor Day weekend when recreation use will be reduced. Effects of ground transportation are discussed in the Wilderness, Trails, and Recreation section, above.

##### C. Alternatives 3 and 4

The effects resulting from Alternative 2 will be similar for Alternatives 3 and 4, with minor differences from the types of helicopters and the number of flights needed to transport equipment and supplies. These alternatives also will have the additional effects of repeated helicopter flights every 3-5 years for concrete maintenance at the dam.

#### 5. Visual Quality

The Bitterroot National Forest's visual resources are managed under the USDA's National Forest Landscape Management System described in USFS Handbooks 434 and 462. This system employs an inventory of the qualitative attributes of each forest acre to produce a Visual Quality Objective (VQO) that will correspond appropriately to management area prescriptions developed in the Bitterroot National Forest Plan, 1987.

Management activities can affect the visual resource by altering the natural form, color, line, and texture in a given view area. Visual effects of the alterations depend on the interaction of factors such as size of heavy machinery required, method of transport to site, amount of helicopter use in frequency and duration, and size of construction camp and occupation time required to complete the project.

These factors will be incorporated into the analysis of the effects of each alternative in meeting VQO's. VQO's are the recommended minimum guidelines for meeting Forest Plan visual goals.

##### A. Effects Common to All Action Alternatives

Foreseeable actions common to action alternatives include the temporary occupation of a helibase and staging area near the mouth of the canyon on private land. This will be visible from the county road that accesses the Charles Waters Campground and it could be within hearing of campground and trail users. Also common to all alternatives is the establishment of a temporary camp and staging/storage area at the dam site with all its attendant equipment and activity.

## B. Visual Quality Effects by Alternative

### 1. Alternative 1

The existing visual situation would remain unchanged under this alternative. VQO's that are currently being met at the trailhead and along the trail would continue unchanged. VQO's that are not being met at the dam site would also continue unchanged.

### 2. Alternative 2

This alternative allows for the renovation of the transmission pipe, rip rapping on the upstream face of dam, renovation of the spillway and reconstruction of the log boom. Personnel and supplies would be flown in but the three pieces of equipment would be driven up the trail. In addition to the impacts from the staging area and effects at the dam site, this alternative also incurs reductions in visual quality along the length of the trail for several seasons until the damaged vegetation and disturbed soil is recovered and looks natural.

Trail users would also notice the effects from the helicopter flights and machinery intrusions. The overall construction period is the shortest of all the action alternatives. Negative visual quality impacts at the lake area would increase for the short-term. The resulting fresh rock and dirt work necessary to complete the project would be more readily apparent, and from greater distances than is now the case. The VQO's of preservation along the trail will not be met for several years. The implementation of the trail rehabilitation plan would speed up the recovery process.

### 3. Alternative 3

This alternative is designed to accomplish nearly an equal amount of work as in alternative 2, but without the impacts of the heavy machinery on the trail. This alternative would involve more helicopter flights, with bigger helicopters than Alternatives 2 and 4. This creates a short-term overhead visual intrusion to recreationists but it eliminates the longer-term visual effects to the trail, and VQO's would be achieved in a shorter period. There would be less visual effects from equipment and machinery at the site with the use of primitive tools, but the overall duration of the construction period is twice as long as Alternative 2.

With Alternative 3, a maintenance program to patch and seal the concrete inlet structure would occur every 3 to 5 years, until the structure would be

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replaced, in an estimated 20-25 years. This maintenance would require entries with a helicopter and motorized equipment, and would require a work camp over a period of 3-5 days. This would effect visual qualities during the maintenance period.

4. Alternative 4

This alternative would have similar effects at the dam site as Alternative 3, but it would involve some trail clearing and modifications to accommodate the smaller excavator and dump truck or bobcats. Visual consequences to the trail from these alterations would not be as severe as with Alternative 2, but they would not meet Forest Plan VQO's for several years.

Like Alternative 3, a maintenance program to patch and seal the concrete inlet structure would occur every 3 to 5 years, until the structure would be replaced, in an estimated 20-25 years. This maintenance would require entries with a helicopter and motorized equipment, and would require a work camp over a period of 3-5 days. This would effect visual qualities during the maintenance period.

POTENTIAL CONFLICTS WITH PLANS AND POLICIES OF OTHER JURISDICTIONS

Introduction

The following statements are provided to help define the areas of potential differences between the agency proposing this action, the U.S. Forest Service, and the policies, management, and enforcement responsibilities of other agencies.

Air Quality

Potential conflicts could exist between the required debris burning activities and Montana Air Quality Standards. However, such conflicts would be unlikely, since all prescribed burning on the Bitterroot National Forest and adjacent National Forests would be managed to comply with the Western Montana Smoke Management Memorandum of Agreement.

Water

Montana State Water Quality Standards require the use of all reasonable land, soil, and water conservation practices (analogous to BMPs) to control nonpoint source pollution. The recognized BMPs related to silvicultural nonpoint source pollution for the State of Montana are documented in "Best Management Practices for Forestry in Montana." As stated in the Memorandum of Understanding between the Forest Service and the State of Montana, implementation of Soil and Water Conservation Practices, as outlined in the Soil and Water Conservation Handbook (FSH 2509.22), will serve as the vehicle to implement the "Best Management Practices for Forestry in Montana." When a site-specific analysis determines there is a resource need which deviates from the BMPs, then a variance for a site-specific alternative practice must be obtained from the State of Montana. All of the proposed actions comply with the BMPs.

Wildlife

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The Forest Service and the Montana Department of Fish, Wildlife, and Parks work together to manage wildlife. Department of Fish, Wildlife and Parks personnel have been contacted and there are no known conflicts.

The U.S. Fish and Wildlife Service has also been contacted, and there are no known conflicts.

Cultural Resources

Compliance with Section 106 of the National Historic Preservation Act will be met before project implementation. Inventories were conducted according to the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation." Consultation with the interested Native American tribes has been conducted per the National Historic Preservation Act, the American Indian Religious Freedom Act, and the National Environmental Policy Act. There is a very low likelihood of potential conflict with the plans and policies of other jurisdictions.

PROBABLE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Implementation of any alternatives would inevitably result in some adverse environmental effects. The severity of the effects can be minimized by adhering to the mitigation measures described in Chapter 2. The No Action Alternative could have the greatest adverse effects, if the dam failed as a result of no action.

Noxious weeds will invade some disturbed soil surface areas, especially along the lower Bass Creek Trail. The impacts are mitigated in part by quickly establishing grass on exposed surfaces, by cleaning equipment, and by controlling noxious weeds through programmatic assessments.

Stream sediment from Alternatives 2 and 4 would temporarily increase over undisturbed conditions. Sediment yields are predicted to be within acceptable limits for fisheries protection, stream stabilization, and beneficial uses.

All of the action alternatives would have an effect on the visual resource from some view points within the assessment area.

RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

Short-term uses are those uses that generally occur annually. Long-term productivity refers to the ability of the land to produce a continuous supply of a resource.

The duration of the effects of dam reconstruction on the water resource is short-term, and will not effect long-term productivity. Erosion and sedimentation from road clearing and widening and increased peak flows should subside after vegetative recovery. These water yield and sedimentation effects are short-term because they should not take longer than one to two years for

recovery. Erosion control work on the old road, with Alternatives 2 and 4 should reduce sediment entry over the long term.

Key habitat requirements for wildlife species including feeding habitat or foraging areas interspersed with nesting or denning habitat. Some nesting or denning habitat may be affected along the trail with alternatives 2 and 4. This will not be widespread and can be mitigated with the consideration of large trees and snags during the trail clearing.

#### IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

An irreversible commitment of resources refers to the loss of production or use of a resource due to a land use decision, that once executed, cannot be changed. An irretrievable commitment of resources applies to losses of production or use of renewable resources for a period of time.

Minor amounts of soil loss and displacement would occur as a result of any of the alternatives. Overall there would be some soil loss due to erosion and a slight increase in sediment production with any of the action alternatives. Trail/road widening and restoration in Alternatives 2 and 4 would cause the greatest sediment movement of all the alternatives. Normal BMPs (Appendix D) would be adequate to keep impacts within acceptable limits set forth in the Forest Plan and by the State of Montana.

#### REQUIRED DISCLOSURES

##### Effects on Social Groups

There are no differences in the alternatives with respect to effects on minorities, Native American Indians, women, or the civil liberties of any American citizen.

##### Effects on Flood Plains and Wetlands

None of the alternatives would be expected to have a discernible effect on wetlands or flood plains. The effects on wetlands are described fully in Chapter 4.

##### Effects on Threatened and Endangered Species

No known threatened, endangered, or candidate species would be adversely affected by implementation of any of the alternatives, as disclosed in Chapter 4.

##### Energy Requirements

Alternative 3 would require the most energy expenditure, because of the use of the heavy-lift helicopter. This would be partially offset with the greater dependence on pack stock with Alternative 3. Alternatives 2 and 4 would require similar amounts of fossil fuel. The energy required to implement any of the action alternatives, in terms of petroleum products, is estimated to be



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2,000 gallons of diesel fuel and 200 gallons of aviation fuel for Alternatives 2 and 4, and 1,800 gallons of diesel fuel and 500 gallons of aviation fuel for Alternative 3.

Effects on Prime Rangeland, Forestland, and Farmland

The alternatives presented are in compliance with the Federal regulations for prime land. The definition of prime forest lands does not apply to lands within the National Forests. In all alternatives, Federal lands would be managed with the appropriate considerations of adjacent lands.